PALISADES LAKE

Introduction

Palisade Lake is an intermediate sized off stream reservoir at the south end of the Sanpete Valley in Central Utah. The original dam was constructed in 1899 by Mormon Pioneers, who hauled dirt in in buckboards without the benefit of power equipment. The lake has been used for recreation since it was first constructed. It is nestled behind a hogback arm of the Wasatch Plateau at the edge the Sanpete Valley. It is located five miles south of Manti, and is the site of a State Park and a golf course. It is also known as Funk's Lake or Palisade Reservoir.

The reservoir shoreline is 50% privately owned and 50% State Park property. Access is unrestricted, but fees are charged for use of State Park property. Water use is primarily for irrigation. By late summer water storage in the reservoir is very low and recreation opportunities are limited. There are no changes foreseen in the future.

Characteristics and Morphometry

Lake elevation (meters / feet)	1,788 / 5,868
Surface area (hectares / acres)	28 / 66
Watershed area (hectares / acres)	6,941 / 17,152
Volume (m^3 / acre-feet)	
capacity	2,131,491 / 1,728
conservation pool	0
Annual inflow (m^3 / acre-feet)	
Retention time (years)	
Drawdown (m^3 / acre-feet)	
Depth (meters / feet)	
maximum	9.5 / 31
mean	5.5 / 18
Length (meters / feet)	792 / 2,600
Width (meters / feet)	488 / 1,600
Shoreline (meters / feet)	2,100 / 6,890

Recreation

Palisade Lake is accessible from US-89 immediately north of Sterling via an access road to the state park, which winds east for about 1.5 miles to the lake. Sterling i s

Location

County	Sanpete
Longitude / Latitude	111 40 00 / 39 12 00
USGS Maps	Sterling, UT 1966
DeLorme's Utah Atlas & Gazetteer™	Page 37 A-6
Cataloging Unit	San Pitch (16030004)

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between Manti and Gunnison

The lake is used for fishing, non-motorized boating and swimming. The state park has 53 campsites, a sandy beach, modern rest rooms with hot showers, a group camping area, a nine-hole golf course and a pavilion. Usage fees are charged.

There is are private campgrounds in Gunnison and Manti (see info box).

Watershed Description

Palisade Lake an off-stream impoundment of Six Mile Creek. Water is diverted by a short (0.7 mile). The natural watershed is a small valley extending one mile north of the reservoir. The valley, which is carved out of the base of the Wasatch Plateau, is several hundred feet higher than Sanpete Valley.

The drainage basin of Six Mile Creek extends to the ridgeline of the Wasatch Plateau. The watershed high point, found at two locations--Black Mountain and the north shoulder of High Top, is 3,316 m (10,880 ft) above sea level, thereby developing a complex slope of 9.4% to the reservoir (from High Top). The average stream gradient on Six Mile Creek is 8.4% (443 feet per mile) and the gradient of the canal is 2.8% (147 feet per mile).

The watershed is entirely composed of the deeply dissected west face of the Wasatch Plateau. See Appendix III for soil composition data.

The vegetation communities consist of pinyon-juniper, pine-aspen, spruce-fir, sagebrush-grass, oak, and maple. The watershed receives 30 - 76 cm (12 - 30 inches) of precipitation annually. The frost-free season around the reservoir is 120 -140 days per year.

According to the 1982 Clean Lakes Inventory, land use is as follows: 90% is multiple use; 5% is recreation, 3% is wildlife land (the Manti State Wildlife Area is managed as winter range for wildlife) and 2% native grazing (mostly cattle and sheep).

Limnological Assessment

The water quality of Palisades Lake is good. It is considered to be hard with a hardness concentration value of approximately 204 mg/L (CaCO3). Those parameters that have exceeded State water quality standards for defined beneficial uses are total phosphorus and temperature. The average concentrations of total phosphorus in the water column rose dramatically in 1992 to a level of 181 ug/L which exceed the recommended pollution indicator for phosphorus of 25 ug/L. Prior to that year average concentrations in the water column were near or below the indicator value. This increased concentration elevated the productivity of the lake to a point that may impair water quality. These impairments may not be readily apparent because the lake is usually drawndown extensively in late summer because there is no conservation pool allocated in the lake. It is not uncommon for surface temperatures to exceed the criteria of 20°C established for a cold water fishery. This enhances the use of the lake for recreation but places stress on cold water trout species.

The lake due to its shallow nature and summer

Limnological Data

Data sampled from STORET site: 494628

Surface Data	1981	1990	1992
Trophic Status	M	M	E
Chlorophyll TSI	-	41.54	44.44
Secchi Depth TSI	45.59	51.53	53.23
Phosphorous TSI	53.19	44.12	78.90
Average TSI	49.39	45.73	58.86
Chlorophyll a (ug/L)	-	3.1	4.1
Transparency (m)	1	1.8	1.6
Total Phosphorous (ug/L)	30	16	178
pH	8.2	8.6	8.7
Total Susp. Solids (mg/L)	15	5	17
Total Volatile Solids (mg/L)	-	-	3
Total Residual Solids (mg/L)	-	-	13
Temperature (°C / °f)	7/45	19/66	19/65
Conductivity (umhos.cm)	435	398	452

Water Colum
Ammonia (mg
Nitrate/Nitrite
Hardness (mg
Alkalinity (mg/
Silica (mg/L)
Total Phospho

Miscellaneou
Limiting Nutrie
DO (Mg/l) at 7
Stratification (
Depth at Deep
1992 Miscella

Information

Management Agencies

Six County Commissioners Association	896-9222
Division of Wildlife Resources	538-4700
Division of Water Quality	538-6146

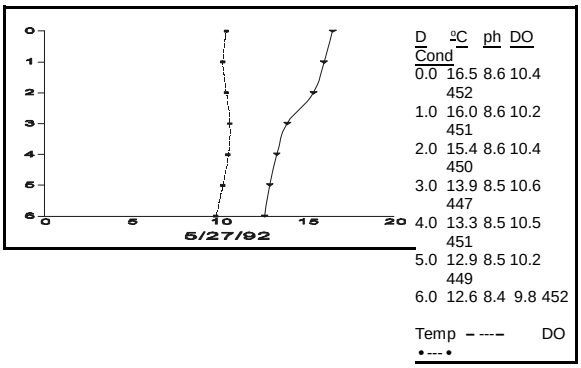
Recreation

Panoramaland Travel Region (Richfield)	896-9222
Manti Chamber of Commerce	835-6271
Palisade State Park	835-7275
Lund's Campground (Gunnison)	528-3366
Manti Campground	835-7851

Reservoir Administrators

Manti Irrigation and Reservoir Company	528-5671

drawdown does not stratify as indicated in the May 27, 1992 profile. The reservoir exhibits nitrogen limitation and has TSI values indicative of a moderately productive system with a mesotrophic status. However, in 1992 the lake exhibited highly eutrophic conditions with elevated levels of nutrients in the lake. There is an extensive macrophyte coverage later in the year as the lake is drawndown.



According to DWR no fish kills have been reported in recent years. The DWR stocks the reservoir annually with 3,000 catchable and 10,000 advanced fingerling rainbow trout. Historical DWR files record carp and bluegill may also be present. The reservoir was chemically treated in 1959 and 1980 by the DWR to control rough fish competition.

Due to the extensive drawdown in recent years phytoplankton in the euphotic zone was not been collected until 1994.

Phytoplankton in the euphotic zone from August 9, 1994 include the following taxa (in order of dominance)

Species	Cell Volume (mm^3/liter)	% Density By Volume
Centric diatoms	0.012	1.12
Dinobryon divergens	0.330	31.55
Euglena sp.	0.041	3.93
Pennate diatoms	0.031	2.97
Sphaerocystis schroeteri	0.612	58.42
Tetraedron minimum	0.021	2.01
Total	1.047	
Shannon-Weaver Index	1.04	
Evenness	0.58	
Richness	0.24	

The phytoplankton community is dominated by the presence of green algae and flagellates indicative of good water quality.

Pollution Assessment

Nonpoint pollution sources include the following: sedimentation and nutrient loading from grazing, chemicals and nutrients from the golf course, and wastes or litter from recreation.

The major use of the watershed is livestock grazing. Heavy runoff and substantial soil erosion contribute to water quality impairments.. The golf course in the immediate vicinity of the lake has immediate impacts on the reservoir. The lake has a documented history of swimmer's itch, a protozoan which causes sevier itching. The protozoan is sustained due to warm summer water, warm water fish and snail hosts. After swimming in the reservoir, individuals should shower using soap and dry off to avoid the problems associated with this protozoan.

Beneficial Use Classification

The state beneficial use classifications include: recreational bathing (swimming) (2A), boating and similar recreation (excluding swimming) (2B), cold water game fish and organisms in their food chain (3B) and agricultural uses (4).